CS112 – Java Programming

Interesting Java Topics

Fall 2022

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Notes

1 week delay for Lab06, till Monday Sept 26. We will go over it this week

• THANK YOU to everyone who put in a lot of work on it already!

Today's homework will be to work on FixCapitalization.java and Plagiarism.java again

- We will go over these today in class
- Due date is Fri Sept 23 11:59pm
- Keep in Lab05 directory!

Quiz03 this Wednesday

Midterm Weds Oct 5th



Java syntax

Computer Science concepts

How to design and write programs

Three main categories of material in CS 112: syntax, concepts, writing programs

- A little more Java syntax every day
- Concepts e.g. "references and objects", encapsulation
- How to design programs is mostly YOUR PRACTICE. We will do examples in class.

Syntax review

Basic variable types: double chanceOfRain = 0.85;

<u>Type conversions:</u> automatic or with cast: float rain = (float) chanceOfRain;

Classes:

```
class MyClass {
   // Class variables
  long classMember;

   // Constructors
   MyClass(float x) { classMember = (long) x; }

   // Methods
  long getValue() { return classMember; }
}
```

Syntax Review

Object creation and use:

```
MyClass anObject = new MyClass();
System.out.println( anObject.getValue() );

Boolean expressions: &&, ||, !, ==, !=, >=, <=, >, <
boolean done = (counter >= maxValue);
boolean programCanExit = done && !foundErrors;

while() loops, if() statements
```

Boolean: true or false USEFUL ONLINE TUTORIAL:

https://testautomationu.applitools.com/javaprogramming-course/

Syntax Review

Constants:

- -17
- How to make long? Short? Byte?

110.34

• How to make float?

What are these?

- 'v'
- "w"

What are Boolean constants?

V: char. W: string. Booleans: true, false

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Last time...

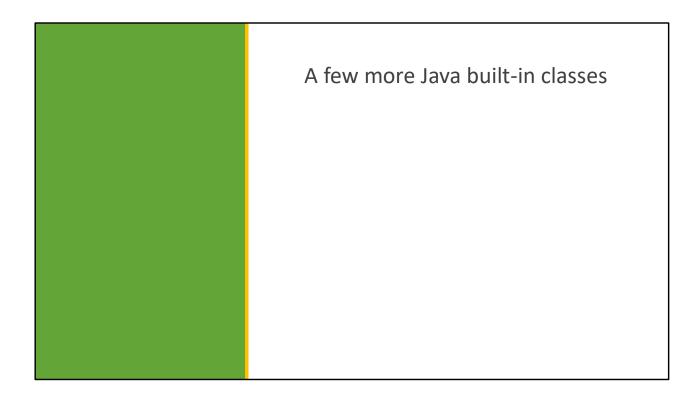
We discussed Objects vs References

And in the lab we worked with arrays, like

- String[] args;
- Card[] allMyCards = new Card[52];
- allMyCards[0], ..., allMyCards[51]

Arrays are like in Python Up to element #51, not #52





"Wrapper" classes

Byte, Short, Integer, Long, Float, Double, Character, Boolean

• Class types that "put a wrapper around" the built-in types

Why use these?

- Sometimes you need a class type e.g. to be stored in Java's advanced storage data structures (arrays, trees, dictionaries, etc)
- Or we want "advanced" functions in the class types, e.g. Character.isLetter(), Character.isDigit(), Character.toLowerCase()

Special capabilities of Wrapper Classes

AUTOBOXING

```
Integer myValue = 1; // how do we mix Integer and int? void doubleMe(Integer x) { x = x * 2; }
```

Similar to the String operation:

```
String myStr = "Look, no call to new!";
```

AUTOBOXING: automatic casting, but only for the Boxed classes. CANNOT DO THIS WITH YOUR OWN CLASSES! (e.g. Doubler)

But more trickiness!

```
void doubleMe(Integer x) { x = x * 2; }
Integer myValue = 1;
doubleMe(myValue);
System.out.println(myValue); // what does this print?
It prints 1
• Why??
```

The "x = x * 2"; statement does <u>not change the value</u> of our Integer object. It <u>creates a new Integer object</u> and has x (but not myValue) point to it

```
But more trickiness!
Another example
void fixMe(String s) { s = s + " (sometimes)"; }
String myString = "I love Java!";
fixMe(myString);
System.out.println(myString);
What does this print?
"I love Java!"
```

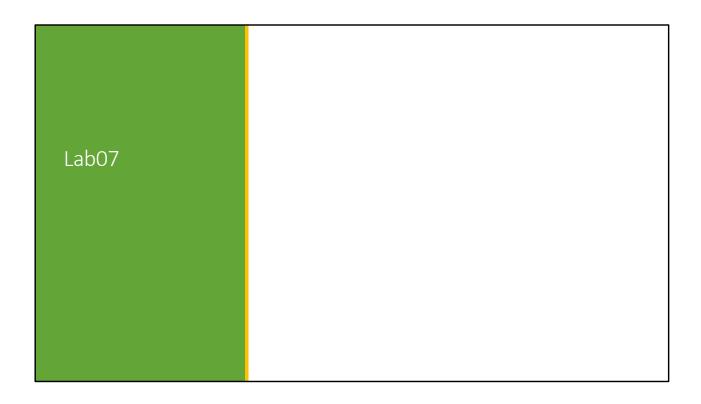
String variables never change values! New String objects are created

```
But recall...
void ProcessNumbers(Doubler ddd) {
    ddd.set(20.0);
}
Doubler myDoubler = new Doubler(); myDoubler.set(1.0);
ProcessNumbers(myDoubler);
System.out.println(myDoubler.get()); // prints 40.0
Why?
We programmed class Doubler so its stored value can change.
Java's built in classes (String, Byte, Integer, ...) are immutable.
```

Immutable. Cannot change value of an object. CAN create a new object

You just have to remember this.

Quiz02	I will return quizzes after picking up from TA's Let's go thru some of the problems



Homework status

First—don't forget—this course is curved.

I am reviewing homeworks with CS dept chair...
...but students are having problems

Let's spend more time <u>learning how to tackle</u> the homework

Lab06 delayed till Monday Sept 26

I am replacing planned Lab07 with FixCapitalization and Plagiarism from Lab05 (again)

- Second chance to work on it
- We will review problems together now
- Due Friday Sept 23
- Keep in Lab05 directory!

If you got perfect score on LabO5, nothing required!